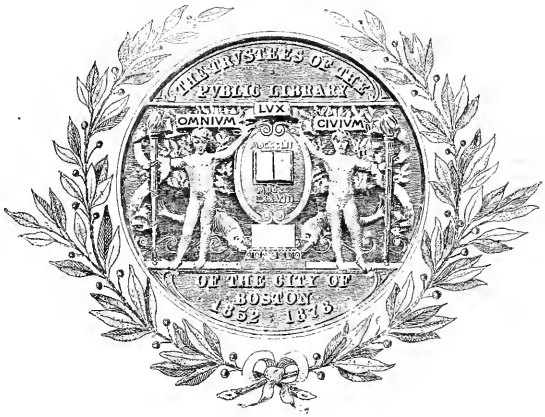

Industrial or Mechanical Drawing.

PAPERS ON DRAWING.

PRINTED BY ORDER OF THE LEGISLATURE,
UNDER THE DIRECTION OF THE BOARD OF EDUCATION.

BOSTON:
WRIGHT & POTTER, STATE PRINTERS,
79 MILK STREET (CORNER OF FEDERAL).
1870.

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House of Representatives, May 11, 1870.

Ordered, That there be printed, in pamphlet form, two thousand copies of the papers on the subject of Industrial or Mechanical Drawing, communicated to the Board of Education by Professors Thompson, Gladwin, Bail, Woodman and others, or such portions thereof as said Board shall select; that two copies thereof be given to each member and officer of the legislature, and the remainder be deposited in the office of said Board for distribution among the several cities and towns of the Commonwealth.

W. S. Robinson, *Clerk.*

The papers printed herewith, in accordance with the foregoing Order, were received by the Secretary of the Board of Education in response to a Circular, issued by a Committee of the Board, of which the following is a copy:—

Boston, December 27, 1869.

To

Dear Sir:—At the last session of the legislature of Massachusetts the following Resolve was passed:—

[Chap. 80.]

Resolve relating to provision for free instruction in Mechanical Drawing in the Cities and large Towns of the Commonwealth.

Resolved, That the board of education be directed to consider the expediency of making provision by law for giving free instruction to men, women and children in mechanical drawing, either in existing schools, or in those to be established for that purpose, in all towns in the Commonwealth having more than five thousand inhabitants, and report a definite plan therefor to the next general court. [*Approved June* 12, 1869.

It is presumed that the term "mechanical drawing," as used in the Resolve, is intended to comprise all those branches of drawing which are applicable to the productive or industrial arts.

In the investigation of this important subject, it is deemed desirable to procure the opinions and views respecting it, of such persons as are most competent to consider it from different stand-points. You are therefore respectfully requested to favor the Board of Education with your observations on the matter, under the following topics:—

1. The advantages which might be expected to result from the contemplated instruction in mechanical or industrial drawing.
2. The course and methods of instruction appropriate for the objects in view.
3. The models, casts, patterns, and other apparatus, necessary to be supplied.
4. The organization and supervision of the proposed Drawing Schools.
5. The best means of promoting among the people an interest in the subject of Art-Education.
6. Any other remarks relating to the subject, not embraced in the foregoing topics.

Please direct your reply to the Secretary of the Board of Education, at the State House.

Very truly yours,

D. H. Mason,
John D. Philbrick,
G. G. Hubbard,
Joseph White,
Committee of the Board of Education.

INDUSTRIAL OR MECHANICAL DRAWING.

MR. THOMPSON'S LETTER.

[From Prof. C. O. THOMPSON, Principal of the Worcester Technical School.]

To the Board of Education:

In response to your Circular of inquiry in regard to Free Industrial Drawing Schools, I have the honor to submit the following suggestions.

ADVANTAGES TO BE DERIVED FROM DRAWING.

1. Skill in mechanical labor is always associated with a nice sense of form and proportion. This sense is to be trained by Drawing.

2. The ability in the foreman of a shop to give accurate sketches of machines, or parts of machines, to a workman, is of great value. This can be gained only by the practice of Drawing.

3. It is probably true that attention to Drawing saves apprentices a good deal of time. A boy who spends two hours a week in Drawing, and the rest of the time in working at machines or at the bench, learns his business faster, and becomes more skilful in it, than one who works all the time.

4. The great bane of foremen in machine shops is the inability of nine-tenths of their workmen to read a working drawing so as to work from it. It is calculated that the productive efficiency of every machine shop would be increased *thirty-three per cent.* if every journeyman could read any common working drawing and work by it. Their present inability to do this leads to working by "rule of thumb,"—that is, to poor work.

The argument of Hon. George F. Hoar before the Committee on Education, in behalf of the proposed grant to the Worcester Free Institute, sets forth the duty of the Commonwealth to her artisans.

On *general principles*, the workingman is entitled to the same

educational facilities, proportionally, that are so liberally accorded to the so-called "educated classes." The alphabet of this *technical education* is *Drawing.*

5. The great advantage to the State would be a superior class of artisans, giving her productions in machinery, manufactures, &c., greater value.

METHODS AND SUPERVISION.

1. A *normal school* should be established at some convenient centre, where there is abundant apparatus already provided. This school will consist of men and women who design to become teachers in the various Drawing Schools. It can accomplish its end in one month—say July. The pupils will then be ready for the winter work. This on the supposition that there are persons enough ready who can *draw*, but who do not know how to teach others to draw in a scientific and effective manner.

2. The first schools should lay out a course complete in one winter. Take Salem, for instance, a town where Drawing is taught in the common schools. Let a teacher go there, open an evening class for journeymen and apprentices, if the number is too large (that is, more than thirty), employ an assistant, and give ten lessons in Free-Hand Drawing, and fifteen in Mechanical Drawing—twenty-five in all. The term *Mechanical* can be so modified in different cases as to cover the wants of machinists, architects and carpenters. It is quite possible that the present teacher of Drawing in the public schools would be able to take charge of the matter after attending the *normal school.* If all this were enthusiastically done and carefully *superintended*, we should confidently anticipate a demand the second winter for a more extended course. I imagine that the matter must be worked up by easy stages, since so little is known about it amongst people in general—even those most interested in this project.

3. The proper method of instruction is the South Kensington plan, with some modifications.

4. There should be a superintendent of Art Schools, appointed by the Board of Education, to supervise all the schools as constantly as if they were in one building.

MODELS, CASTS, PATTERNS, &C.

1. These Industrial Schools will ultimately include all forms of industrial art; but the great demand for them at first will come from carpenters and mechanics. The great need of these men now is ability to make plane projections and cross-sections of machines

and structures. Hence, to carry out the general idea of educating our working classes up to the idea of artistic work, I should begin by simple drawing from the flat, and from such cheap wooden models as might be obtained in each town without much expense. The copies in the flat the teachers would have on hand as the result of their Normal course, and excellent ones can be found in the leading industrial journals. I should say that five hundred dollars will be ample for forty winter schools. I am led to this opinion by the fact that at the Chandler Scientific School there are no *Models* in the high sense of the word, and next to none at other good schools. Now the drawing done by their pupils, though not of the very highest order, is nevertheless a great and valuable acquisition, and answers the demand of practical life admirably. I think that any great outlay for models, casts, &c., on the part of the Commonwealth, can be deferred two or three years.

2. Beyond a doubt, a temporary loan collection of works of art suitable for art-students to study, can be made in any large town by the favor of owners of private collections.

METHODS OF INTERESTING THE PEOPLE.

1. Liberal circulation of the Report of the Committee of the Board of Education who are now considering the subject, in which might be included the address of Cardinal Wiseman to the laborers of Manchester, England. This exhaustive and invaluable pamphlet, it is hardly necessary to say, is edited in America by Miss Elizabeth P. Peabody, and is for sale by Lee & Shepard in Boston.

2. The Board of Education could designate some competent person to visit the large towns of the State and address the people on the subject. If this were done pretty soon after the Act of the legislature, or pending its action, the work of organizing the schools would be greatly facilitated.

C. O. THOMPSON,

Principal of the Worcester Technical School.

MR. GLADWIN'S LETTER.

[From Prof. GEO. E. GLADWIN, of the Worcester Technical School.]

1. The Resolve of the legislature of Massachusetts, relating to the proper instruction of men, women and children of the Commonwealth in Industrial Drawing, is of the greatest importance.

No one can question the utility of the art of Drawing, as its usefulness may be seen and felt in almost every trade or business of life. We need in this country the dissemination of a sound and true taste, which will not only raise the character and value of our manufactures, but also the intellectual appreciation of those who have to produce and consume them.

2. The first step to be taken to elevate the public taste, and to secure to our industrial classes the skill which would in consequence be demanded, is to cause Drawing to become a regular branch of instruction in all the common schools of the State. Teachers especially prepared should give this instruction as far as possible. Where this is not possible, our regular teachers should adopt certain definite modes of training the eye and hand of their pupils, which are simple and feasible, and which training would be of invaluable service to them in after-life.

Besides the regular school instruction in elementary Drawing, which should reach all classes of pupils without exception, there should be afforded an opportunity for *special instruction in Drawing* to those who have passed through their school course without this privilege, especially to our apprenticed mechanics and all of both sexes who are engaged in industrial pursuits.

In all of our large towns evening schools might be formed for this purpose, under the auspices of literary or mercantile associations, and receiving the sanction and encouragement of the town authorities. The payment of a small fee, by each member of such schools, would work beneficially, making them in part self-supporting. State help would be appreciated all the more highly, by requiring each member to aid in their support.

At these schools a systematic and thorough course of industrial Drawing should be pursued. The only way to produce a good draughtsman is by giving him sound principles by which he can work intelligently and accurately.

A good foundation must be laid in *free-hand Drawing.* A definite knowledge and practice of correct form is indispensable. This can only be obtained by a bold and decided course of free-hand Drawing in outline.

By this means a large measure of *artistic power* may be acquired, an element very necessary in the mechanical enterprises of the day. The end to be sought in this training, is the correct expression of real forms. A mechanic, especially, should possess the power of correctly representing, by drawing, a definite form before him, or the idea of such a form he may have in his mind.

The training, then, should be early directed to drawing from real objects.

3. After a series of lessons from *flat examples* given by the teacher upon the blackboard, simple *geometrical models* of large size should be arranged as studies, and great exactness and fidelity required in their representation upon paper. Studies may also be made of the most *familiar objects*, singly and in groups.

Plaster casts of ornamental forms, figures, flowers and foliage can all be used with the greatest benefit in this course of instruction, and in the study of which the majority of pupils will not fail to be greatly interested.

No one needs the free-hand training more than those preparing to be strictly mechanical draughtsmen; and such training (however short the course, and it must necessarily be so in all special schools of drawing,) will be of incalculable service in their mechanical stages of Drawing.

4. I am not prepared to state how these special schools for drawing should be organized and conducted, but think a simple and wise plan would be quickly settled upon if the State should set in operation such a movement.

The greatest difficulty in the way, will be in the lack of properly prepared teachers to take hold of this work with enthusiasm. Their preparation must be provided for. There should be a training-school established for this purpose, giving sufficient encouragement to those with an aptitude for drawing to devote their time to it.

5. The best means of promoting among the people an interest in this subject, is for our legislature to devise a liberal scheme for this *special education in art* of our working men and women, and to spare no efforts until it is put into successful operation.

GEO. E. GLADWIN,
Worcester Technical School, Worcester, Mass.

MR. WARE'S LETTER.

[From WILLIAM R. WARE, Esq., Professor of Architecture in the Massachusetts Institute of Technology.]

MASSACHUSETTS INSTITUTE OF TECHNOLOGY,
BOSTON, September 30, 1870.

Hon. JOSEPH WHITE, *Secretary of the Board of Education:*

SIR,—In answer to the questions which the Committee of the Board of Education have done me the honor to address to me, I beg to submit the following observations.

I. The instruction of men, women and children in those branches of Drawing which are applicable to the industrial arts, may be expected to obtain for them, in a greater or less degree, the benefits of an increased development of the powers of perception, a new means of expression, and new sources of enjoyment. Drawing gives one a new sense and a new language; and not only is its exercise a delightful recreation in itself, but it opens the eye of the mind to the endless beauties of nature and art. It is thus an invaluable element in general education. To the workman it is of the greatest practical use. If he does not carry it so far as to become a skilful draughtsman himself, it yet enables him better to understand drawings made by others and to work intelligently from them, and to represent, however rudely, things that cannot well be explained by words. He is a more intelligent and serviceable workman. If he attains to real skill in the use of his pencil, and develops the tastes and talents that cannot, without this training, be either discovered or made use of, he becomes a valuable person at once. Every branch of our manufactures is suffering for the want of just this intelligence and skill.

The introduction of Drawing into school-work would also do something to mitigate the evils arising from the exclusively literary character of our public teaching. Anything that brings manual skill again into repute, and counteracts the growing disposition to discredit every means of livelihood that does not consist in "brain-work," merely, is a positive gain to our civilization.

Moreover, if there is, as there always must be, artistic talent of a

higher order lying undeveloped in the community, the general diffusion of sound instruction in Drawing is a sure way of finding it out and of making it serviceable. There is undoubtedly in the community at the present moment a large number of persons of great artistic capacity, whose abilities, which might have given them name and fame, and have shed lustre upon their age and country, are wasted in inefficiency and neglect. A general education in the elements of art would have given them the means of success, and created a public ready to appreciate their work.

II. The system of instruction to be pursued must of course be determined in great part by the capacities and predilections of such instructors as it may be possible to secure. Mechanical Drawing by the use of instruments and India ink on the one hand, and the Free-Hand Drawing of ornament and of the human figure on the other, with charcoal or crayon, are excellent, and, at last, indispensable. But I believe that the requirements of Industrial Art may be met most directly and simply, in the first instance, by the adoption of what one may call a Free-Hand Mechanical Drawing, in which accuracy and precision in the delineation of objects is obtained by the training of the eye alone. Beginning with right and curved lines, the square and the circle, the pupil may proceed at once to the details of machinery, carpentry or architecture, or of flat and raised ornamentation, putting in the geometrical forms without instruments, and gaining as he goes on a knowledge of light and shade, and of the principles of Geometric and Isometric Drawing, and of Perspective. This style of drawing, although mechanical, has the advantage of being easily learned and easily taught, and while it encourages the pupil by producing immediate results and giving him an accomplishment of great practical value, it forms an excellent basis for that freer and more artistic study of foliage, flowers, animals, buildings, landscape and the human figure, upon which the Industrial Arts chiefly depend. The best success has attended the introduction of this system both in this country and abroad.

III. Elementary work of this sort requires only chalk and blackboards, pencils and paper, with a certain number of printed or lithographed copies for the use of the teacher. It is thus especially adapted for class teaching and for instruction in the public schools. It is an excellent plan for the student to draw the simpler figures, at least, several times, first on the blackboard, using the whole arm, next on a large sheet of paper, to train the hand, and then on a smaller scale still, to exercise the fingers. The use of dots and crosses, in place of lines, to begin with, as illustrated in Mr. Bartholomew's

school cards, seems to me to be a device of unusual merit, and to be capable, by the addition of short tangent lines, or lines of direction, of extended application in the preparation of more elaborate work. Prints and lithographs of a more advanced character are needed for the higher instruction, and the practice of drawing from "the round," that is to say, from solid objects, should be introduced after a certain degree of skill in manipulation is attained. This is more inspiriting, and is in every way more instructive than drawing from "the flat;" but if introduced too early in the course it necessitates an amount of supervision and individual attention on the part of the teacher that can hardly be afforded when the classes are at all large. Large wooden models of geometrical forms are excellent, though somewhat expensive. Models of machinery are of the greatest value, especially for classes of grown men, and though expensive to make or buy, they could in almost all our large towns probably be obtained on loan from the manufactories. Plaster casts of ornament and the human figure are no less indispensable, and are fortunately very cheap and easy to be had. A lead pencil or crayon and a piece of Manilla paper are all the apparatus the student needs for a long while. Even in learning the use of instruments the student can get on a good way with a T square, triangle, inch scale, pencil, India rubber and pair of dividers. The use of pens, ink, brushes and color should be put off as long as possible.

IV. The evening schools should probably have an experienced schoolmaster at the head as manager, with skilful draughtsmen as his assistants to give the instruction. These two functions are distinct, and capacity for them both is not likely to be found in the same person, especially as the head of the school should, presumably, be an American, while the teachers, at least in the more artistic work, will presumably be French, German or English. Every large town will probably be able to supply skilled workmen perfectly qualified for this work—machinists, lithographers or professional draughtsmen.

In the day schools for children, the Drawing should be taught by the regular teachers; and as they are for the most part quite unskilled, it is of the utmost practical importance that the system of drawing adopted should be so simple that they can administer it with success. But anything that the children can learn to do in the course of the year the teachers can acquire in the course of a few weeks, and there need be no fear that a practicable scheme will not be found.

V. The best means of promoting a public interest in this branch of education is undoubtedly a public exhibition of the re-

sults. Prizes, of nominal value, awarded by competent judges for the best work, would give a zest to its enjoyment and would stimulate the zeal of the students. If the best work of the different schools could every year be collected and compared, and State prizes awarded, and the whole collection, or at least the prize pieces, could be circulated among the schools, it would doubtless create a lively emulation all over the State and would establish in the worst schools the standard of the best.

But the greatest effect upon the public mind is probably to be produced by local exhibitions, in all the large towns, of the results of industrial art, collections of art-workmanship of every kind, illustrating the application of design to manufactures. Such exhibitions constantly take place abroad, and are found to be of the greatest value in stimulating the interest of the manufacturer, the workman and the public.

In England, the Science and Art Department have arranged a small museum of such objects—glass, pottery, iron and bronze work, textile fabrics, &c, &c.—packed in cases equally convenient for travelling and for exhibition, which goes constantly from town to town where Schools of Art are established, and forms the nucleus of occasional art exhibitions all over the kingdom, the community in which each exhibition is held supplying what it may possess to add interest to the show. Such a scheme would probably work perfectly well in Massachusetts. Every large town possesses treasures of such art that the owners would gladly contribute for such a purpose.

VI. At the Universal Exhibition of 1851, England found herself, by general consent, almost at the bottom of the list, among all the countries of the world, in respect of her art manufactures. Only the United States, among the great nations, stood below her. The first result of this discovery was the establishment of Schools of Art in every large town. At the Paris Exhibition of 1867, England stood among the foremost, and in some branches of manufacture distanced the most artistic nations. It was the Schools of Art and the great collection of works of Industrial Art at the South Kensington Museum that accomplished this result. The United States still held her place at the foot of the column.

I am, very truly, your obedient servant,

WILLIAM R. WARE.

MR. BAIL'S LETTER.

[From Prof. LOUIS BAIL, of the Sheffield Scientific School at Yale College.]

SHEFFIELD SCIENTIFIC SCHOOL, ENGINEERING DEPARTMENT,
YALE COLLEGE, NEW HAVEN, January 4, 1870.

To D. H. MASON, Esq., and others, *Committee of the Board of Education, Boston, Mass.*

GENTLEMEN:—In answer to your communication of December 27th, I respectfully submit the following:—

"1. The advantages which might be expected to result from the contemplated instruction in Mechanical or Industrial Drawing."

Such instruction will make our nation richer, by making our artisans more tasteful and skilful, and by developing the latent talent of the industrial classes. Without this cultivation no people can aspire to become a first-class manufacturing nation, nor will they be able to compete successfully with the products of skilled industry in the great markets of the world.

Special scientific schools or colleges are indispensable to the highest development of the arts under consideration; but they are insufficient, for they fail to reach the masses, and therefore cannot reform the industry of the country. These scientific schools have little effect upon the masses of our mechanics, except to prove the heights to which the mechanical profession may aspire. They furnish no means accessible to the great body of mechanics, and offer to them no systematic instruction by means of which they may become more intelligent and skilful in the performance of their labors.

There is too much guess-work in our mechanical operations, that can only be obviated by such instruction as you propose. A great deal of time and material is wasted in "cutting and fitting" and making things only "about right," when absolute certainty and correctness of plan should have been secured beforehand. There is no form, however complex, that can not be indicated by drawing in such a manner that an intelligent workman, who is competent to read or understand drawings, can execute the object represented with absolute certainty. The simple ability to read plans and

drawings fits a man for a good position. In fact, the foreman of a shop is often the only man who is able to do this. By leaving our mechanics in this semi-barbarous condition, we lose much money and credit, and lower the intellectual and moral condition of our artisans. The more mind a man brings to bear upon his business, the more respectable and self-respecting he will become.

Why is it that a majority of our apprentices are of foreign parentage? Why is it that American boys are growing too proud to "learn a trade"? Is not the cause found in the fact that our whole system of education has quite ignored an industrial life? The only legitimate result of our educational system will be the production of lawyers and doctors, or at the least, clerks and school teachers. In consequence of this defect, children receive the impression that education has no bearing upon mechanics; that a trade is only manual drudgery. The result is, that our boys select the most effeminate employments in preference to manly mechanical work.

When our educational system provides our youth with some intelligent preparation for the prosecution of industrial labor, the trades will be filled by a more cultivated class of young men, and our boys will blush to be found selling pins and needles; but they will not be ashamed to be seen using the hammer and chisel.

The whole nation is deploring the lack of good ornamental designers. We are becoming tired of sending so many millions to Europe for articles that we might produce cheaper at home if we had skilful designers. This branch of industry affects articles for the homeliest use.

Beauty of form and ornamentation is the quality always referred to as perfecting the claim to notice and value. It is hoped that the female population will, so far as possible, occupy a field so well suited to their capacity and taste.

"2. The course and methods of instruction appropriate for the object in view."

I shall perhaps be pardoned, if under this head I allude freely to my own experience and labors. In apology for this, I will add, that I was, when quite young, appointed professor in the Technic Institution in Nuremberg, Bavaria, which sustained, in connection with the regular Scientific School and Trade School, an Industrial School for mechanics. I have, since this time, been much occupied in consideration of the interests of the industrial class, and have had constant experience, by the *actual teaching* of persons engaged in every common branch of industrial labor. I commenced work in this country in the Mechanics' Institute, New York, and have

since had several thousand artisans under my instruction. My experience has led me to entertain the most sanguine hopes for the future of American Industrial Art. I believe there is no other class in this country so anxious for instruction as mechanics. I am sure there is no other class willing to make so great sacrifice to obtain instruction.

Mechanics are the sinew of our commonwealth, and deserve the highest consideration of educators. At the conclusion of a lesson, gray-haired mechanics have often almost overpowered me with thanks, saying to me: "This lesson is worth hundreds of dollars to me;" or: "I shall work better all my life for this." I have often found some pupil repeating the lessons to others poorer than himself.

I have become so affected by the conviction of the need of mechanics and their desire for knowledge, that I resolved to give a free course of lessons each year to those who are unable to pay for instruction. Of last year's course, our school superintendent says in his report, page 33: "Within a few weeks, I have been told by members of that class that the knowledge obtained is worth hundreds of dollars to them, in the increased facility and exactness with which they are enabled, in their daily work, to prepare their patterns and construct difficult forms in mechanical operations."

The lessons referred to are given in the City Hall on Friday evenings. We shall be happy to have any person interested give us a call.

In no department of our industry would the result of judicious training prove more speedy, obvious and profitable than in Ornamental Design. Any system of instruction that fails to provide for this important branch of industry will be defective. The mechanical use of copy books will never make a designer. The competent teacher in Ornamental Design will be able to do much for his pupils in a few lectures. He will commence by illustrating the simplest form of ornamentation by the use of the dot; he will bring examples from nature—as feathers, shells, flowers, &c., &c.; next he will draw lines, giving the simplest forms, and show their different changes and combinations. A figure composed of a multitude of lines only serves to confuse the mind of the pupil. As the power of analysis increases, more complicated ornaments should be presented.

The various styles of ornaments peculiar to different nations must be presented. Beautiful forms must be presented as models. The taste of the pupil will soon become informed, but he will reap little practical benefit unless these instructions are preceded by sound

elementary training of the hand and eye. This training should form the basis or initial step to every department of Drawing.

The pupil in Mechanical Drawing must first acquire knowledge of the use of the mathematical instruments. He must then learn to draw and construct practical problems in plane and descriptive geometry, which will be found to be the language and interpreter of all Mechanical Drawing. Next comes Isometrical and Perspective Drawing.

At the conclusion of these lessons, the pupils are divided into different classes, in accordance with their pursuits. The common practice of commencing Mechanical Drawing by placing a pattern before the pupil and requiring him to copy it, is a miserable caricature upon teaching. Every step of the operation should be performed and thoroughly explained in the presence of the pupil; it should also be illustrated by models. The instructor should possess broad culture, but he should not confuse his pupils with the variety and extent of his knowledge. He should be able to bring out of his treasures "things new and old," but he should never present any question for speculation or display. He should study to present principles of the greatest *practical* use to his pupils, and to teach them the practical application of these principles. It requires great judgment and experience to select from the mass of knowledge what is most practical and fitting. Our mechanics, as a rule, are too much wearied with labor to find interest in questions outside their calling. They want the prospect of some tangible good to incite them to industry and improvement. It appears to me, therefore, that the initial undertaking should be devoted chiefly to practical results in the Industrial Arts. The individuals who are by this course incited to higher attainments will be provided for in some of our scientific schools.

The principal special classes will be as follows: Machinists, carriage-makers, carpenters, joiners and stair-builders, tinners, masons and stone-cutters, carvers and modellers.

In connection with these classes, lessons should be given in Physics, Mechanics, Chemistry and Mathematics.

I have private notes of my entire course in the different branches of Mechanical Drawing, and if they can afford any aid in this cause, I should be happy to show them to any gentleman of the Board. You may at any time command my services in this good cause.

"3. The models, casts, patterns and other apparatus necessary to be supplied."

For Descriptive Geometry: Models of various planes, superficies and solids.

For Perspective: The perspective plane with various apparatus; also model for explaining the arches, &c., &c.

For Machine Drawing: Models of wood of various parts of machinery; a sectional working model of an engine; models for illustrating the principle of belting and pulleys; the various wheels and other simple models.

For Architectural Drawing: Models of the Grecian and Roman orders of architecture, and of various styles of other countries; models of roofs of houses and steeples; of a frame house; models of various winding stairs, doors and windows, &c.

For Carriage-Makers: A simple frame of a carriage for the explanation of the "French rule."

For Tinners: The envelops of various geometrical solids.

For Carvers, Modellers, Decorators and Designers for fresco, paper-hangings, carpets, calico, silver and glass ware: A variety of plaster models and ornaments, patterns of ornamentation of various styles and countries, &c., &c.

"4. The organization and supervision of the proposed drawing-school."

The foundation of such branches of education as it is now proposed to introduce should be laid in our public schools; therefore the success or failure of the enterprise must depend in a great degree upon the zeal and intelligence of the teachers. The Normal Schools should be provided with a thorough and systematic course of instruction. It would be wise to convene a normal session, with the express object of preparing teachers for the work. These teachers should be required to submit to an examination by a competent authority, who should also supervise their work. If it is objected that many of the class it is proposed to benefit by special instruction will not remain in the public schools till they advance to the drawing, I reply that a child five years old should begin to learn to draw. The longer instructions are deferred after this age, the greater the loss. As soon as a child enters school, a regular systematic training of the hand and eye should commence. This is of double value, promoting in the child habits of observation and comparison.

This is not a matter of speculation, but has been proved by actual practice in this and other cities. If any person doubts the expediency of such early training, a visit to our public schools would convert him.

I am certain the time is not far distant when this training will be accomplished, and that our grammar schools will also make some progress in industrial drawing. Drawing from objects and models

should become as familiar as writing to the pupils of these schools. We have been speaking of what *should* be. Our purpose is to take the material we have at hand and make the best use of it. It appears to me that in the special Drawing Schools we must depend mainly for instructors upon the public school teachers.

My experience as teacher leads me to conclude that the preparation of teachers may be accomplished without special difficulty. I have seldom given a course of lessons in Industrial Drawing, but at the conclusion of the term some leading members of the class would step into the front rank and take the position of teacher. Their labors have often been attended with marked success.

Teachers are more intelligent than the industrial classes; more ready to receive, and more expert to communicate instruction. I have had many teachers under my instruction and supervision, and I have found them prompt to receive and impart knowledge. Without doubt, each town of over five thousand inhabitants has a teacher or teachers already somewhat skilled in Drawing, and who would be willing, with such encouragement as the Board will be able to offer, to fit himself fully for the work.

The Board should define strictly the duties of these teachers. In the larger towns, special Drawing Schools on a more extended scale should be established.

"5. The best means of promoting among the people an interest in the subject of Art-Education."

The individual classes here especially referred to, are already in advance of educators on this subject; at least this appears to be the case in our vicinity. It was in answer to the persistant demands of this class that Drawing was introduced into our public schools.

Copying pretty little drawing-patterns has not excited the interest and confidence of the masses, nor the approval of the more cultivated class; but we believe the industrial classes may safely be trusted to recognize their true interests. To promote a permanent interest in Art-Education, we have only to consult the greatest good of the people in our plan of instruction. There is nothing like true teaching to arouse and retain the popular heart. Some people have the impression that everything can be accomplished by words. A good lecture upon Art does indeed act as a stimulant, but cannot afford nutrition and growth.

"Talking" without "chalking" is to little practical purpose with the masses.

Among the advantages that will result from the contemplated course of instruction in our public schools, I omitted to state that

the immediate effect would be to elevate the character of our scientific schools. The pupils in these schools have at present little or no preparation in Drawing for the mechanical departments. We are therefore compelled to spend a great deal of time with the elements of Drawing. This greatly detracts from the character and efficiency of these schools. Apply the same condition of things to any other department of college instruction, and the difficulties will be appreciated.

Your obedient servant,

LOUIS BAIL.

MR. BARTHOLOMEW'S LETTER.

[From WM. N. BARTHOLOMEW, Esq., Teacher of Drawing in the Public Schools of Boston.]

To the Committee of the Board of Education:

GENTLEMEN,—In noticing some of the advantages which might be expected to result from the contemplated instruction in Mechanical or Industrial Drawing, we may give a prominent place to mental development.

Drawing is an intellectual exercise, the power of which resides in the head, and not in the hand, as some suppose. The head directs the hand: that it may direct it aright, it must have knowledge; and this calls for study. In learning to draw, there are laws of Nature and of Art that must be investigated and understood; and in the representation of forms, however simple, there must be mental effort. Without thought, one can no more describe the form and appearance of an object by means of lines, than he can without thought describe it by the use of words. Considered in the light of an intellectual exercise merely, the mental effort which the study demands must be of advantage to those who receive instruction.

The tendency of this study is to make one a close observer. In order to represent an object correctly, one must have an exact knowledge of it. This does not come by intuition: it can only be gained by exhaustive observation. Every part must be thoughtfully studied. With students of drawing, this way of looking at things soon becomes a fixed habit, the value of which is inestimable. There is no profession or calling in life in which success does not depend, in a measure, upon exact observation. This habit once formed, one will carry it into his business, whatever it is.

Subtlety of sight is another advantage to be derived from this study. It is a common notion, that one must *see* a thing if it is before his eyes. This is a mistake. The uneducated eye sees only the most palpable and conspicuous truths: everything minute or obscure is unnoticed. Keenness of sight, as well as that of hearing

or touch, is the result of education. As a rule, we have left the education of the eye to chance; and the result is, that we are, as a people, comparatively blind. Many of us walk daily amid the most beautiful scenery, and yet we see it not. We are surrounded by objects, the presence of which would be to us a source of the most exquisite pleasure if we could but see their beauty. By our neglect, we lose one of the most fruitful sources of pure enjoyment. Besides this, we are losers in a pecuniary view. To the mechanic, this education is a matter of dollars and cents. With it, his labor is sought after, at high prices; without it, he is often compelled to seek for employment, and receives for his labor just enough to enable him to keep soul and body together. The mechanic is skilful or unskilful according to the acuteness of his vision. In producing good work, the difficulty lies not so much in *doing* as in *seeing* what to do. If the eye is keen, the hand is cunning; but, if the eye be dull, the hand is awkward and clumsy. A trained eye not only enables the mechanic to do a certain piece of work better than it were possible for him to do without this training, but he can do it in less time, and with less labor. Seeing exactly what he has to do, he drives to the mark at once, instead of feeling his way along as one must who cannot see clearly.

This study cultivates the habits of *neatness* and *accuracy*,—habits which will not come amiss in any branch of business. The art is neatness itself; and, in the practice of it, accuracy is quite as important as it is in mathematics.

Drawing cultivates the taste. That we are affected by those things we come in frequent contact with, no one questions. Surround us with objects of beauty, and we soon learn to appreciate them, and to find pleasure in their contemplation. And this is especially true if we are taught to study and delineate their forms. Educate the mechanic so that a thing of beauty will be to him a source of pleasure, and he is a better workman. His love of the beautiful will be manifest in his work. We shall have from him objects of taste, as well as use. Deformity will be repulsive to him; and, in all that he may do, his constant aim will be to avoid it. This it will do for the man: but the good that has been done will not end here; for, in elevating and refining the taste of the laborer, you have taken him out of the ranks of the common workmen, and made him an educator.

A very large proportion of all the Art we have comes from the Old World. In all matters of this sort, we live, to a great extent, by borrowing. It is not because our workmen lack the germ of Art that they are not skilful in design: all they lack is an Art-

Education. Will it pay to give them this? Other nations find it for their interest to give their workmen every facility for becoming skilful in their business. If it is a paying thing for them, will it not be a paying thing for us to do the same? Every dollar that the State may spend in giving to her people an Art-Education will be returned to her again with usury.

The study and practice of Drawing develop the power by which we retain in the mind impressions of form. Most persons are exceedingly deficient in this power, for the reason that nothing has been done to develop it. The ability to retain in the mind clear and distinct impressions of form is a great blessing to any one. He who can bring to mind, with all the clearness and freshness of reality, the views he has seen, possesses a power he would not part with on any account. To those who would originate anything new in the way of design, this power is indispensable. New forms are always made of old ones; and hence, in producing anything new, the more extensive the collection of beautiful and useful forms one has stored in memory, the more hope there is of success.

That the study of Drawing develops the imagination is a matter well understood. That which helps us to get clear and distinct views of the actual, also enables us to obtain clear and distinct conceptions of the ideal. The imagination is the inventive faculty. Its full development, therefore, is a matter of the first importance in the case of every individual.

A practical acquaintance with the art of Drawing enables one to understand the drawings of others. Those who have had the most experience with mechanics, where they have been called upon to work from a drawing, can best appreciate the value of this attainment. After the drawing has been explained over and over again, until both you and they think they have a clear idea of what is required to be done, you must stand over them while the work goes on. In case you leave for any length of time, the chances are, that, on your return, the work done will need to be undone. There are exceptions, of course; I speak of them as a class.

A few days since, I chanced to meet E. P. Morgan, Esq., Mechanical Engineer of the "Saco Water Power Machine Shop;" and, in the course of our conversation, he said, that through the inability of their workmen to understand a drawing, hundreds of dollars were lost every year. Now, what is true in this case is true of our manufacturing establishments all over the land. The time lost in doing that which must be done again because of error; the loss of material, the use of power, and the wear and tear of tools to no good purpose; the time of engineers and foremen spent in explaining draw-

ings which would have been understood at a glance had the workmen been instructed in Drawing, and the time consumed in listening to these explanations,—costs the country, it is safe to say, millions of dollars annually. This, certainly, is an argument in favor of doing something towards giving our mechanics some knowledge of Drawing.

Having noticed some of the advantages which may be expected to result from the contemplated instruction in Mechanical or Industrial Drawing, both to the individual and to the State, we may now inquire whether the schools which it is proposed to establish will be able to do all that needs to be done in the way of Art-Education among our people. Upon this point I think there can be but one opinion. One of the first conditions of elevating the Art of the country, in all its forms, is the general diffusion of artistic knowledge and taste among our people. Omit this, and you educate the few to little purpose. These schools must fall far short of meeting the exigencies of the case; and yet they will be invaluable, for they may reach a class of persons that cannot be reached by other means. They may do something for those now engaged in the active duties of life; but they can do little or nothing for the future mechanics of the State or for their patrons. This work must be done in our *public schools.* Sow the seed of an Art-Education in our primary schools, nurse and nurture it through the whole period of school life, and you educate the eye, train the hand, and cultivate the taste, of every member of society. Both duty and interest demand that Drawing should be made a *required* study in every public school in the Commonwealth. It may be said, perhaps, that it is impossible at present to introduce this study in our schools because our teachers, as a rule, are ignorant of the art. If you wait until our teachers are well qualified to instruct their pupils in this branch of study before it is introduced, you never will cease to wait. The teachers, especially those who are instructing young children, are already in advance of their pupils. Let them begin the work of teaching, and, by study and practice, keep in advance. Certainly they ought to be able to progress as rapidly as their pupils. Want of time is sometimes urged as an objection to the introduction of this study, particularly in our grammar schools. In reply to this objection, it may be said that the help it affords in learning to write amply compensates for the time devoted to it. This is the opinion of many of our best educators. Whatever objections may be urged against the introduction of this study in the grammar schools, they can have no weight as applied to our primary schools. Hours are spent in these schools daily, to no good purpose. Let a part of this

time be devoted to drawing on the slate and the blackboard. If the exercise is properly conducted, it may be made exceedingly useful in many ways, aside from its value as a means of training the hand and educating the eye.

The early lessons in these schools should be devoted to the work of training the mind to judge accurately of *position*, *distance*, and *direction*. Instead of using lines for this purpose, to begin with, I have found dots to answer better. They have this advantage over lines. It requires no mechanical skill to make a dot: the mind can be given entirely to the truth to be expressed. This is not the case where lines are used. When a change is necessary in order to keep up an interest in the work, very short lines may be used, and these put in the form of crosses and stars. As the pupil progresses, these crosses and stars may be so placed with respect to each other as to form very pleasing figures; and in this way, while the eye is being trained to see, and the mind to judge of position, distance and direction, the taste is cultivated. Children soon get an idea of the principle upon which these figures are constructed; and I have seen some very pretty figures of their own design. In this work, they should be encouraged; and set times should be devoted to this exercise with the view of developing the inventive faculties.

There should be an occasional exercise in Drawing from memory, after the example selected has once been drawn from sight. This is a valuable means of strengthening the memory for form.

By such exercises as I have suggested, the cultivation of the eye and the hand, the improvement of the taste, the development of the inventive powers, and the strengthening of the memory for form, may go on together, and the study be made a means of *improvement* as well as *amusement*.

In referring to the course and method of instruction appropriate for the Drawing schools which it is proposed to establish, I would suggest that the course of study should begin with the drawing of lines, angles, and plane figures. The objects aimed at in this practice should be, discipline of eye and hand, cultivation of taste, and the strenghtening of the memory for form. To secure these objects, the pupils must be required, in executing their work, to depend upon the eye and hand alone. The subjects given then for study and practice should have as much beauty in them as circumstances will allow. The drawing of examples from memory, after they have once been drawn from sight, should be frequently practised. The examples used should be lithographic drawings.

It is a favorite notion with many, that, in learning to draw, pupils

should begin at once to draw from objects. It is said, that, in drawing from printed examples, they are allowed to make line for line, and dot for dot, without a why or wherefore. This is often true, perhaps more frequently true than false; but this is an argument against the *abuse* of examples, not against their *use;* and if carried out, would do away with all text-books, for all are abused. In training the eye to see, and the mind to judge, of the length and position of lines, and of the relation of lines to each other, examples have a decided advantage over objects. It is this. In the use of the former, the pupil has the means of determining to a certainty whether his work is right or wrong, and, if wrong, where the error lies and in what it consists. This he cannot do in drawing from objects; and since, in Drawing as in everything we undertake, our progress depends upon being able to discover and correct any error we may make, the advantage of printed examples over objects, at this stage of the pupil's progress, must be apparent. Again, when the pupil is prepared to commence the study of solids, there is no way by which he may so readily become familiar with the application of the principles of perspective, as by the proper use of well-drawn examples; and it is the *only* means by which he can gain an acquaintance with the mechanical operations of Art. Learning to draw would indeed require some *special gift*, unless one could learn something from the experience of others.

As soon as the pupil is somewhat familiar with the laws of Nature and of Art, and can give a reason for all he finds in the examples given him to study and imitate, he should be set to drawing from objects in connection with examples. Here, again, the pupil should be required to draw frequently from memory. By adopting the course suggested, the use of examples may soon be dispensed with altogether, except to refer to occasionally as a means of assisting the pupil out of any difficulty he may not be able to master alone.

Just how much time should be devoted to drawing from objects in these schools, depends upon so many circumstances, that it is impossible to fix any limit in advance. As the mechanic will find frequent occasion in his business to represent forms as they appear to the eye, sufficient attention should be given to this branch of the art to enable him to draw any simple subject with a good degree of accuracy.

The next step in the pupil's progress should be to learn the use of instruments. He should be taught how to construct all those mathematical forms that are of use in the practice of Art; and, fol-

lowing this, he should be taught to draw plans, elevations, and sections of buildings, machinery, &c.

Pupils should be kept in classes as much as possible, so that the time of teacher and pupil may be economized. Anything that may be said in favor of class-teaching, in any study, applies equally well in the study of Drawing.

As to the Casts, Models, Patterns, and other apparatus necessary to be supplied, I may say, no extensive collection will be needed. A few hundred dollars will abundantly supply all their wants for the present. An Art Library should be connected with these schools. An institution of this kind will exert an influence for good.

In relation to the organization and supervision of the proposed Drawing Schools, I would suggest, as very desirable, that none but the deserving be received as pupils, since there will not be room for all. To secure a good class of students, applicants should be required to bring a certificate from their employer, or from some responsible person, certifying that they are persons of good habits, and that they will be likely to make good use of the advantages offered. One teacher will be required for every thirty pupils. No one can do any thing like justice to a larger class. Those who have the supervision of these schools should have the power of conferring some token of honor on those who shall have made good progress. This might be in the shape of a certificate; and, coming from such a source, it would be of value to those who may receive them, in many ways.

As to the best means of promoting an interest in the subject of Art-Education among the people, I would propose, at the close of every quarter, or at the end of each school-year, to have a public exhibition of the work done by the pupils. This should be held in some hall conveniently located, and be free to all. Special effort should be made to secure an attendance of the working-men. What they may see will be a topic for conversation in the shop and factory for weeks, and many will be inspired to do something for themselves, who otherwise would never think of self-improvement. During the exhibition, an evening lecture should be given upon the subject of Art-Education.

Another means of awakening an interest in this subject is the publication, in the journals of the day, of good common-sense articles in relation to it. Much may be done by giving it a prominent place in our Teachers' Conventions; and those who stand at the head of our educational institutions may aid the movement by giv-

ing it that attention, in preparing their reports, which its impo tance demands.

In conclusion, I propose that there shall be connected with thes schools one or more Training Schools for the education of teacher I think this is a matter of great importance. There are many wh are able to Draw, but there are very few who are thoroughly com petent to teach the art to others.

Respectfully submitted.

WM. N. BARTHOLOMEW.

MR. WOODMAN'S LETTER.

[From Prof. JOHN S. WOODMAN, of Dartmouth College—Chandler Scientific Department.]

DARTMOUTH COLLEGE, CHANDLER SCIENTIFIC DEP'T, January, 1870.

To the Hon. D. H. MASON and others, *Committee of the Board of Education of Massachusetts.*

GENTLEMEN:—I have only time to answer briefly and hastily the questions proposed, and I reply rather from my great interest in the subject than from any hope of adding to the more carefully arranged and valuable views of other able and experienced teachers who will advise you.

1. The advantages of culture in Drawing are great, aside from artistic production. The training the arms, hands and fingers for any sort of work—the eye to see and the mind to perceive and comprehend; the power to express ideas by drawing for all the ordinary business of life; the aid in the school-room to all other branches of study; the culture of the power of attention, order, arrangement and the sense of fitness and good taste, and for rational occupation and enjoyment;—these are enough to indicate its exceeding value to every person, aside from all special artistic work. It looks towards every pursuit, duty and relation of life. The practical utility of training in the elements of free and instrumental Drawing, to every person whomsoever, is not second to that of any other subject of common school education. It is, moreover, the only foundation for high success in the industrial and fine arts. To speak of a single topic—the culture of the general and the creative imagination, exercised and trained by Drawing; it would wake up and stimulate all the other powers and faculties in a wonderful degree, increase greatly the products of every industrial activity and the enjoyment of tasteful and artistic work, and multiply all the powers of arrangement and invention. I do not hesitate to say, that over and above the general social elevation and the increase of enjoyment, a proper training in Drawing of ten or fifteen years, in many a town in Massachusetts, might double the industrial effi-

ciency, and put two for one on account of this influence. But a view of all the advantages of Drawing would tax your patience, and, to be fully understood, require some degree of the very training in which we, as a people, are so deficient. The whole community need to be trained so as to feel the deficiency and enjoy and desire artistic products, before industrial Art, or general Art, can be placed on an elevated and permanent basis. Therefore I know of nothing now so much needed in education as Drawing.

2. It is more difficult to indicate the best course and methods of instruction appropriate for the objects in view. Time, experience and honest effort would develop what is requisite. The English, French and German mind is so different from the American, in respect to dependent, obedient action in accord with long-settled institutions and methods, that I doubt the highest success in this country of the same methods which are the best for them. The American youth needs to be directed, encouraged and stimulated to train himself, and so retains some considerable element of his own conscious individuality. This gives our people an impulse from within,—a versatility, a power and efficiency, nowhere else found; and, with a broader and more solid general education, would be much more conspicuous than it is. But there is no doubt the methods and experience of the European schools, where this culture has so long been prominent, is of great value for our study and readjustment to our own necessities. The culture is broad, and requires attention during all the school life. A few months of time is worth something. But what would be said of a few months training only for a musical education? And yet Drawing looks practically towards every pursuit, duty and relation of life, in addition to its power in Art, to which field music is mainly confined.

The shortest and best way is to begin at the beginning, and teach Drawing in the schools like any other primary, fundamental branch of education—both in the public schools and in special schools—and to begin with the first elements of the subject, just as in reading and writing you would begin with the alphabet, and so on. There is no other rational way. Unsound, fanciful and deceptive notions about the subject should be corrected. It is to be understood—and I fear there is a very common misunderstanding—that the whole culture tends to produce a means, an instrument, a facility, a language, for use in every practical and common, as well as in every higher and nobler way, and does not of itself supply the want of other culture and other knowledge. Let not the student be disturbed for a moment in his confidence in the value and necessity of sound learning in all the other branches of study,

already amply provided by the Commonwealth. Let him feel that this branch is mainly to give him a new language and power for all purposes, and especially for daily business and industrial work—the same that reading and writing gives to the literary man or the merchant, enabling him, with vastly more facility, to use what knowledge he has, and to possess himself of what he has not. How many a youth, pleased with the idea of learning Mechanical Drawing, as he terms it—meaning, probably, drawing made exact and nice by instruments and other mechanical aids, or drawing for mechanical purposes, or both, (for the expression has not as yet a very exact technical usage,)—and after spending much time, has found out that to become a good mechanical draughtsman he must know mechanics, natural philosophy, mathematics and all the rest; that merely drawing for a lifetime would no more give great ability, power and value to his services in that line, than mere penmanship could give him power to write a Hamlet or a Paradise Lost. Again, false views of what makes a great artist are injurious. It is too common a mistake to think it genius and skill in artistic execution; and the young man learns too late that greatness, truth and power are in the man's soul, and put there mainly, under God's guidance, by his own honest, faithful and laborious expansion of all his native powers, by every sort of best and noblest training and hardest experience, and not by any facility in his fingers or happy instinct in adjusting lines and hues. What a man does not know, and cannot comprehend and feel himself, he cannot powerfully express.

The work to be done is Drawing, which might be understood to include Free Drawing and Instrumental Drawing The free drawing, the work with whatever material or color—whether with pencil, pen, crayon or brush, used with the unassisted hands and eyes, and covering the whole range of subjects from the lowest to the highest. The instrumental drawing, work of whatever kind made even, rigid and exact, by the use of the ruler, drawing-pen or any other aid than the mere pencil or chalk. This latter to be taken up in the higher schools only. The first is much the larger and more important, and requires little else than paper and pencil. The second is soon accomplished after the first, but not before, and requires drawing-boards, T rulers and a variety of other instruments. The second should cover drawing for geometry, descriptive geometry in all its branches, (the orthographic projections, spherical projections, perspective, shades and shadows, &c.,) topography and mapping, drawing for carpentry, engineering, architecture and machinery. In both the free and the instrumental, the practice should be

from flat copies, from the objects and from inventions and designs by the students, and perhaps, to some extent, in time, looking towards special artistic industries—as decoration, the manufacture of porcelain, of furniture, of textile fabrics, &c.; though there is some question in respect to these latter, whether the interests of private manufacturers, the intelligent activity of art associations, and the influence of our many able and cultivated artists, would not better accomplish this more special artistic work, after such a foundation as I have indicated. But there is time enough to consider that question while the public interest and the public training are being made sufficient to afford a basis for reasonable success.

3. The models, casts, patterns and other apparatus necessary, need not, at first, be numerous or expensive, and can always be readily obtained. A large collection might stimulate a transient interest in the public mind, but a few are better for the student. The principal thing is work—patient, regular, long-continued, persistent work by each student. Without this, all the rest amounts to very little. The principal agency in effecting this in every school and class, is the directing, encouraging and stimulating power of an intelligent teacher. Here will be the great difficulty at first. But all good teachers may soon learn to do this work, whether they have special skill in drawing or not. After the subject is once well started, teachers will begin to get a proper understanding of the scope, purposes and methods, and to work in this line with as much confidence and success as in arithmetic or any other elementary subject.

4. The organization and supervision, in detail, would require large knowledge, with judicious observation and experiment. No judgment beforehand is sufficient. The first public movements better be simple and few. There could be no harm in allowing Drawing to be made a required daily study in any public school, whenever the committee, with the State agent or supervisor, should agree that it was judicious to begin the instruction; and that such decision at first depend on the facts of the general interest and wishes of the community about it, and upon the ability of the teacher to produce good results; and that the work be not encouraged unless there is a disposition to give at least twenty minutes every school day to drawing (or about double that time to drawing and writing together), for the whole school for a full year. The aim should be to make drawing gradually, in five or ten years, in every school, a fundamental, elementary, required study; to fall into its place, in the present excellent school system of the Commonwealth, without complicating the system or increasing its cost.

It would be a most valuable work to establish also free Drawing Schools in the larger towns and cities, at first under the same general conditions, except to require at least ten hours' work per week, a part of the time in the class and a part at home, for six months in the year. After a time, these might be required by law in every large town and city. I have great confidence that these, well managed, would in time so interest the many now seeking frivolous or unworthy amusements in their hours of leisure—so awaken their powers and open the way to a more ready use of all their knowledge—that they would be stimulated to useful and valuable acquisitions in many other directions, and find new resources in pleasant occupation, and new safeguards against temptation, to say nothing of the value of the culture itself.

An agent or director of Drawing, with moderate means and ample powers, would be necessary, for a time, to supervise and shape the whole undertaking. Many successful teachers for this elementary work, even among our highly cultivated and able artists and draughtsmen, cannot be found, or cannot be induced, to take up this sort of teaching. So the first thing is to encourage and train teachers in this subject. It can be done, as well as in any other subject; and why it is not already done, is because the necessity for it has not been recognized and felt. The normal schools might soon prepare every graduate for the work. For a time there would be need of a few special training schools to prepare teachers. Also much might be done by short teachers' institutes, two or three times a year, given to this special work, held wherever a community would require drawing taught in the schools, and require all their teachers to attend such an institute for two or three days at a time, and where a sufficient number, say thirty to sixty, could be brought together at once under the direction of the State supervisor. This would help to make a beginning in the schools, and prepare the way to a growing interest and culture, and in time to an ample supply of successful teachers.

5. Interest in Art-Education would be promoted by disseminating sound views, and calling attention to it in all ways—by the press, by public lectures, by art collections and museums, by associations, by drawing schools, and by drawing in all the schools. The great agency will be the quiet and efficient training and work in the schools—both in the common schools and the special schools. This will bring all the solid, abiding value, and all the interest that belongs to the subject, into the culture of the people, and with it the active enjoyment of this noble training, and also a grateful sense of

relief from our present deficiency, and satisfaction at the removal of such an obstacle to our higher industrial and social condition.

A wise adjustment of all these questions will call for the best judgment of the many able educators of Massachusetts, and all the skill of an intelligent supervisor. And whoever shall aid to establish permanently, upon its proper basis, such a great and beneficent culture, will deserve the esteem of a public benefactor.

Very respectfully,

JOHN S. WOODMAN.

MRS. DICKINSON'S LETTER.

[From Mrs. J. W. DICKINSON, Teacher of Drawing in Westfield Normal School.]

Drawing has been slow in gaining a place among the branches of a common school education. The truth has been at last forced upon us that we have made a grave mistake in excluding Drawing from our courses of study. If it has not been entirely excluded, it has, at best, been regarded as an accomplishment, to be acquired only by a few, having abundant time and talent.

Those who have given any attention to the subject, have done so for the sake of the pictures they could make, rather than for any discipline they could derive, or for any help they could obtain for other study.

These errors have not been made in the matter of Drawing alone. We study too much for what we can *do* with knowledge, rather than for what we can *become* by means of it.

As a consequence of this, we find ourselves disappointed in the results of the application of our boasted system of education. We have thought that the universal diffusion of knowledge would give us a nation of scholars; but now that the experiment has been fairly tried, we find ourselves very far from this result. Looking for the cause, we find that our schools have done little or nothing in the way of training the powers, either of body or mind. Following out this idea, our attention is called to the subject of Drawing as a means of culture.

The question, "What are the benefits to be derived from Drawing?" is a difficult one to answer; for while many of these benefits are readily seen, not escaping the eye of even a superficial observer, there are many others, of which even those who practise Drawing are not conscious, and which no one will see unless he has a class of pupils and watches the effect of their work upon them.

Perhaps I cannot give my own idea of the advantages to be derived from the study of Drawing in a better way than by describing a course for our common schools, which, from my own observation

and experience, I consider well adapted to secure the best results of this study.

First, what shall be our aim in teaching Drawing? Plainly, not to make artists. If this were possible, it would not be desirable. The most we can do in this direction is to give marked talent, where it exists, an opportunity for development. If any pupil finds himself possessed of the talent and the love for Art, which shall lead him to make it a life study, he will thank us for the training which first awakened the love and gave him a right direction at the start.

Again, our pupils are not to work for the sake of the pictures that may be made. Every teacher of Drawing in this country has been obliged to contend with this false notion, and it will be a happy day for us when the notion is banished.

Our aim in the common schools must be to give the pupils, throughout their course, such a thorough training of the hand and the eye, that they will, in the end, be able to represent readily and accurately the form and appearance of any object. This is the *aim* in Drawing; but so many other advantages result from the training in this branch, that it is doubtful if the incidental advantages are not quite as valuable to the pupil as the end sought.

By the *training of the eye*, we mean such constant exercise of the powers of comparing and judging, that the forms, distances, directions and positions of objects can be estimated with unerring certainty.

By the *training of the hand*, we mean such constant exercise of the muscles used in giving expression to these estimates, that the hand will obey the will with readiness and precision.

The *course in Drawing* should be divided into an elementary and a scientific course.

The elementary course, beginning with the first teaching in the primary schools, should embrace exercises in lines, straight and curved, and their application in the representation of simple objects. I would confine the outlines to the front view of the object, with no attempt to represent thickness or shadows, except by the strengthening of some lines, which will, if rightly done, impart the first simple ideas of light and shade, give something of relief to the drawing, and increase its beauty.

When sufficient facility has been gained in the drawing of outlines, from the objects themselves, from memory, and from the drawings of others,—for I would have my pupils able to copy, as well as to make drawings of their own,—they will be ready for the higher course, which will begin with the Laws of Perspective, so

simply and attractively presented as not to confuse or discourage the pupils. They will then be ready to practise the drawing of objects in any position, also to study shading and shadow; and this may be followed by Mechanical and Industrial Drawing, if there is time for them.

Throughout the whole course, the work should be alternately on the blackboard and on paper. The object of drawing on the blackboard should be to attain the power of rapid free-hand drawing.

No other practice so surely gives freedom and boldness of execution, and no power is more valuable as an aid in explanation or illustration.

The class standing at the board are first shown the proper manner of holding the crayon,—are shown what muscles are to be used, then these muscles are exercised. Gymnastics may be used with advantage in Drawing, as well as in other branches of culture. The pupils are then required to place the crayon firmly on the board. On removing it, a mark is found. This mark is called, in Drawing, *a point.* Placing the crayon again on the board, it is moved. The result is *an extended mark.* This we call a line. We next teach with care what constitutes a good line in drawing on the board. On this point the class will need patient practice and careful criticism, day after day, as we proceed in our course.

We ask the pupils to make a line of a certain length and direction. Let it be measured and tested. It will probably be found faulty in length, direction and quality. This will prove to the pupils the need of the training of the hand and eye which we are now to give them. Lines may now be drawn in different directions and tested with a rule, which should be used *only* for testing. I would have the course in lines partly inventive, as this gives exercise to the ingenuity, and also cultivates independence in drawing. I would not, however, confine the work entirely to exercises of this kind. More interest may be given, especially to young pupils, by providing them with slender sticks or slats, requiring them to make combinations with a given number, always making a limit, as this gives more exercise to the ingenuity, and also renders the work more definite. Such exercises lead directly and naturally to drawing from objects.

Each lesson should afford new work. One exercise should lead naturally to another, the combinations and designs becoming gradually more complicated and more interesting, using angles, triangles and other regular figures.

Daily exercises in concert drawing should be given. These should consist of a review of some part of the lessons of the pre-

vious day, and careful preparation and practice should be required of the class.

The same concert exercises may sometimes be repeated for several days, the drawing becoming more and more rapid. By such exercises, rightly conducted, the habits of attention, promptness, care, neatness and accuracy may be cultivated.

No opportunity should be lost for cultivating the taste by contrasting beautiful forms with those that are ungraceful and without symmetry. Even in the simple combinations of a few lines these marks may be readily pointed out, and the pupils will soon learn to detect faults in these respects themselves, and to avoid them in their own work.

A part of the practice every day should be the measurement of lines and spaces by the eye and testing by the rule, dividing lines into equal parts, making regular figures of a given size, and also the representation of simple objects placed before the pupil. A slate, a pane of glass, a window, a door, and many other objects at hand, will furnish subjects for this practice.

The pupils should be required to observe objects with reference to making drawings of them from memory. This will be found to be one of the best exercises for cultivating habits of observation.

This practice in Inventive Drawing, and in Drawing from Objects, should continue until straight lines can be drawn with readiness and precision. A similar practice in curves then follows, giving still better opportunity for training in free, bold, sweeping lines. The combinations and designs in curved lines will be much more varied and graceful, and the simple objects to be represented are numerous and convenient for use,—a cup, a vase, a basin, a pitcher, &c., &c. Then will follow naturally the drawing of leaves, flowers, and animals.

Many persons object to the drilling in *lines* as tedious and useless. If we practised Drawing merely for the sake of the pictures, it might be so; but our aim is *to train the hand and the eye.* And my own experience has convinced me that this can in no other way so quickly and so surely be done. That it requires *patience* should be in its favor rather than against it; we shall be none the worse for culture in this direction, for, as a nation, we are wanting in this virtue. In Germany the practice in Drawing of this kind is continued for years rather than for weeks, and the results are seen and acknowledged when we go to the Germans for our designs, our engravings, our maps, and for whatever requires a trained hand and eye.

It will be readily seen that these elementary lessons in Drawing

form a valuable auxiliary in the study of other branches. The earlier lessons are lessons in arithmetic and in geometry; the later, in botany and in natural history; while every line in Drawing helps to excellence in penmanship.

Alternating with the lessons on the blackboard, a similar course is given on paper, with this difference, that the instruction is given personally, so that those who are able may go on more rapidly than others.

The object of the work on paper is to attain nicety and precision, together with flexibility and firmness of touch.

The position of the body and of the paper and the manner of holding the pencil must receive careful attention. Every combination and design should be first practised till the teacher is satisfied with the work; then a careful transfer should be made to a book or to paper for preservation.

In representing objects on paper, a light sketch should first be made, and directions for partial shading should be given. A few lines, and *lines only*, should be used in shading. No "scrubbing in," or even blended shading, should at present be allowed, and every touch should have *a meaning*.

Sometimes a good lithograph of an object similar to the one sketched may be put into the hands of the pupils as a study, for the formation of a good style. Occasionally one may, with advantage, be copied by the pupils for the same purpose; but these studies should be selected with the greatest care, as, from the mass of cards and books furnished us, only a few are of the least use in Drawing, and very many of them are much worse than useless in the hands of the pupils. Alas for the teacher who is compelled to depend upon cards or books or charts in giving instruction and training in the Art of Drawing!

A long time may profitably be spent in the sketching and partial shading of the front view of objects; and when considerable facility has been gained, the pupils will be ready for the course in Perspective. These lessons may be made the most simple and delightful of all lessons. Step by step, with ever new pleasure, the pupils may be led along, working out problems and applying the principles learned to the representations of objects about them, till they have learned all they will ever need to use of the rules of Perspective.

Some teachers deem it better to lead the young pupils to represent at once the thickness of objects from observation, without waiting for rules; but wherever I have seen this done, the perspective has been decidedly faulty, and these faults, often repeated,

afford a bad training for the eye, which should be accustomed to accuracy in all the work done.

My own observation leads me to choose, decidedly, to leave all perspective representations till they can be made by rule and measure.

I have thus given a course in Drawing, which, in my own experience, I have found efficient in the training of classes in the Art of Drawing.

MRS. J. W. DICKINSON,
Teacher of Drawing in Westfield State Normal School.

MR. BARRY'S LETTER.

[From CHARLES A. BARRY, Instructor in Drawing in the Public Schools of Boston.]

Nature, presenting objects to the uncultivated eye hides their lines. Place a child or any uneducated person before one of the simplest solid forms even, and only the solid body, as a definite shape, will be seen. Its different lines and angles, with its curves if there are any, will make no impression whatever on the mind of the beholder. Hence it follows that the eye of the uneducated person and that of the child do not see correctly.

I desire to prove this, and in order to do so must distinctly assert that *ordinary* sight is very poor sight, and that *correct* seeing can only come by the most careful training of hand and eye.

By correct seeing, I mean that active investigation of the eye which enriches the understanding, and gives perfectness and durability of the ideas of external things to it. It is that sight which keeps the soul alive to, and comprehensive of, the eloquent languages of Nature and of Art.

Ordinary seeing is emphatically, in an artistic sense, but a little more than almost total blindness; and (will it be believed, I wonder) that multitudes of men and women have no conception whatever of the way even by which they see things? I would like to ask how many people there are—(readers of newspapers, for instance)—that can truly describe the process by which the image of an object is conveyed to the brain, or begin to tell why only one image of anything is seen by two eyes?

The fact is, American education in this matter of properly seeing things has been altogether defective. Every child should begin to draw when it begins to write, and I would impress it again and again upon the minds of parents and teachers, teaching a child to draw means, more than all else—teaching it to *see correctly*.

If it is asked, of what use in common life is the artistic sight, I answer, it is of inestimable use, inasmuch as it tends to improve the intellect of the masses, purifies the tone of their moral character, ministers to one of their deepest needs, and constantly adds to

their well-being, especially to the well-being of the industrial classes, by giving increased perfection to the products of their industry, and by saving them many a hard-earned dollar that now has to go to the professional draughtsman. Go wherever you please about the country, into any community, and you will not find a dozen mechanics who can make even the most common-place sketch for any sort of work. Builders, masons, carpenters, cabinet makers, ship-builders, millwrights, blacksmiths, jewellers and inventors are obliged to communicate their wants (if they need pictorial delineation for their productions) to some one who can draw, and that some one can scarcely ever be found out of the very largest cities.

Such a state of things should cease at once in American civilization. Elementary schools for the cultivation of Drawing should be immediately established and kept in a flourishing condition, and in a very short time they would prove themselves to be vast sources of improvement, both physical and intellectual, to those who attended them.

Moreover, the nation would gain by them, as other nations have. And I urge the proper study of Art as a national benefit,—not the art of pictures and statutes, but the art of design—the art that increases the adornment of the objects of our daily wants. Are we not bound to advance any scheme that will add to our honor? Do we not know that æsthetic development has not begun in our manufactures? Where, in all the world of taste and cultivation, would an American fabric, claiming to be artistic in its design and execution, sell? France would not look at it. England would not harbor it. Prussia would laugh at it. As to the French, in this connection, let me say that in all those manufactures of which taste is a principal element, they are far in advance of all civilization; and why? because the eyes and hands of all classes have been duly trained in Schools of Design. In France, children begin—almost with the commencement of their eating—to learn to see. If you doubt this, ask the first French boy you encounter in the Louvre to tell you what constitutes the difference between Ingres and Corot, to make you a sketch of Milo Venus, or one of the prancing horses at the entrance of the Champs Elysees. Ask him to draw you a tangent to an ellipse, or to find the true apex of a pyramid in perspective, to make you an acanthus leaf, or an ornamental scroll for the corner of a shawl—and then take him into the gardens of the Tuileries, and set him to telling you the characters of the flowers there, and the value of their colors in a chromatic scale. Go to England —the English boy is on the track of his French neighbor. He will

quote Ruskin to you by the hour, show you the beauties of Turner and Stanfield, draw lines for you as firm as Gibson's, design a water-gate or a wind-mill—and catch him if you can on curved surface or shadow-plane.

So should it be—so I hope it will some day be—with the American boy; for now, notwithstanding all our bragging in respect of our educational systems and our American Art, he is by far too often disgracefully ignorant of the simplest rules of pictorial representation. Why can we not help him? Why can we not improve his eyesight, and teach him to draw—and so ennoble him for life?

Setting out from this point I might show how men and women may be benefited by the study of Elementary Drawing, and how thoroughly essential the study is to general education. Here in America the masses scarcely ever look below the surface of anything, so it is not to be wondered at that not one person in ten among them can tell what a straight line is, nor one in a hundred put a circle in true perspective. Let us make our education sound in this respect hereafter or talk no more of our æsthetic culture, keeping ever in remembrance the saying of that old English poet, "A boy is better unborn than unbred."

Now, let it be at once understood that what every person sees is determined beforehand by the condition of the mind.

Here is one who will look for hours upon children at their play and see only flesh-and-blood copies of himself; but there is one, who, looking upon the same scene, will frankly admit a deep consciousness of inability to see the half of what he knows is there. The first can only receive common preceptions of form and beauty; but the second will see spiritual loveliness and endless grace, exquisite shapes of saintliness, and great wealths of color. The images painted on the retina of the eye of the first are as true as those received by the eye of the second; but intellectual comprehension is altogether wanting.

The education of the eye in æsthetic study must closely precede the education of the hand, and the mind be kept perpetually awake to the consequences of every line drawn.

Mental preception must be at once trained to acquire the true character of straight, curved and broken lines, then of their combinations and their relations to each other, or to a complete figure.

The steps of education in this matter of artistic sight admit of no deviation; they go from a mathematical point, physically expressed, to a straight line, which is a succession of points; from a straight line to an angle, from an angle to the simplest geometrical figure, from simple to complex geometrical figures, from them to a

solid cube, from a cube to parallel perspective, from parallel to angular perspective—at which point the student will begin to see how blindly he has always groped his way. He will now commence to understand the true proportion of things and their true relations to each other. Multitudes of beautiful forms will appear to him, and he will almost feel the enlargement of his better being in the contemplation of them. Whole fields of enjoyment will open to him, and he will walk among men a nobler and a holier man. God's glory of the sunset—all of the divine offerings in the natural world—will be his while life lasts, and when the white veil of flesh standing between him and his hereafter falls away from him into the bosom of demanding earth, Memory will keep her seat in the mysterious Intelligence he calls his soul, and hold them sacred to him forever.

And now in regard to teaching children and young persons to draw. I might expatiate a week upon the subject, and still find somewhat to say in favor of it.

Of the utility of Drawing as a necessary branch of education, there can be no question, What words are to language, lines are to form; the first make the speech of the tongue, the second the speech of the eye. The language of the tongue is not universally the same; but that of the eye is intelligible to all, in all countries alike. It would take me a long time to enumerate the branches of human industry to which Drawing might be successfully applied. I can only say that the possession of a skill to draw adds a new power to the possessor. See what Locke says in his Thoughts on Education: "when he, (the pupil,) can write well and quickly, I think it may be convenient not only to continue the exercise of his hand in writing, but also to improve the use of it further in drawing." Correct drawing, and a facility in making objects representing them, or giving expression to ideas, may be acquired by all. The chief art of learning anything is to attempt but little at a time, and children, young persons, and old ones, can be carried easily, and with infinite pleasure to themselves, from straight lines to pictures of flower-filled valleys or mountain ranges.

Neither is it expected that *artists* will be made of any of them; for the acknowledged king of authorities on all æsthetic matters truly says: first, you must find your artist in the grain; then you must plant him; fence and weed the field about him; and with patience, ground and weather permitting, you may get an artist out of him—not otherwise.

CHARLES A. BARRY.

DR. BARNARD'S LETTER.

[From Dr. HENRY BARNARD, Commissioner of Education, Washington, D. C.]

OFFICE OF EDUCATION,
WASHINGTON, D. C., Jan. 4, 1870.

Messrs. D. H. MASON, JOHN D. PHILBRICK, G. G. HUBBARD and JOSEPH WHITE, *Committee, &c.*

GENTLEMEN:—To the several topics of your communication of December 27th ult., I reply as follows:—1. In respect to "the advantages which might be expected to result from the contemplated instruction in Mechanical or Industrial Drawing;" for thirty years I have advocated the introduction of Drawing, as a regular and indispensable branch of study in public schools of every grade, as a part of general as well as special culture, for the training of the eye and hand, of the conceptive faculty, and the appreciation of the beautiful in Nature and Art. If we are ever to have a system of Industrial as well as of Art education, or if any provision is to be made for the future occupation of the mass of our pupils in the public schools, *Drawing must be introduced as the very alphabet and key to the whole scheme.* No one power, after the ability to read, write and cipher, can be made more pleasurable and useful, both in its acquisition and manifold applications. No acquisition can introduce its possessor more directly into the region of the beautiful, the true and the good, both intellectually and morally, or prove so directly useful in every mechanical occupation, and in the work itself of instruction in natural history, natural science, geography and other studies.

2. "The course and methods of instruction" in Industrial Drawing, must depend to a great extent on the class of schools into which it is to be introduced; although the first principles are as applicable to one school as to another. Your inquiries, addressed as they will be, to practical teachers in different parts of the country, wherever a beginning has been made in this department,—to the Professors of Drawing in the School of Design of the Lowell Insti-

tute, and in the Institute of Technology, Boston; to Professor Woodman of the Chandler Scientific School of Dartmouth College; to the Professor Gladwin at the Worcester Technical School; to Professor Bail in the Hartford and New Haven Schools; to the Professor in the School of Design for Women of the Cooper Union, New York; to the Professor of Drawing in the Public Schools of Cincinnati, and other practical teachers, will secure responses which will at least give you the results of the experience thus far reached in our own country. But, as the subject is new with us, we can profitably turn to the schools and the experience of other countries, and learn how the problem of instruction in Drawing, both in its introduction and in its modifications to adapt it to the different industries, has been solved. To aid you in this branch of your inquiry, I will send you, as soon as Congress shall take action on its publication, a "*Special Report on Scientific and Industrial Education; or an account of the Systems, Institutions and Courses of Instruction on the Principles of Science, applied to the Arts of Peace and War.*" In this document, a volume of 800 pages, you will find schemes of Industrial instruction in different countries, and in more than one hundred schools of different kinds and grades, from the polytechnic to the Sunday and evening school and class. In all of these schools much time, through the whole course is allotted to Drawing. You will also find in the same report, several extended and elaborate reports and programmes on this subject.

In the chapter on France you will find a very able report by M. Ravaisson, Inspector-General of Superior Instruction, in the name and behalf of a special commission created by the Minister of Public Instruction to consider the whole subject in its general as well as special bearings, its educational discipline and industrial uses. The suggestions and recommendations of this report were made the basis of the present system of instruction in Drawing, in all the Secondary Schools of France. In the same chapter, you will find the programme of instruction in this branch, in connection with a new course of study drawn up and prescribed by the Minister of Public Instruction, for all the *Secondary Special Schools* which have been established within the last three years, as one of the results of the governmental inquiry into technical education, as well as a valuable equivalent for the old classical training. You will also find the methods pursued in the government Schools of Art, the *La Martinière* at Lyons, the report and action of a committee of the municipal authorities at Paris with reference to the introduction of Drawing into all the public schools of that city, and the results of a conference of teachers and managers of Art schools from all parts

of Europe, in Paris in 1869 on the methods and management of this class of schools.

Under the head of Belgium, where a system of instruction in Drawing in reference to national industries as well as to the fine arts, technically so called, has existed for a century, you will find the course prescribed for the Academies and Schools of Design, for the support of which the government makes an annual appropriation of over $50,000, as well as that in the Industrial schools and apprentice workshops, which are aided by the State and the local authorities, both municipal and provincial. For the encouragement of Art, this little kingdom of about five millions, appropriated more than $200,000 in 1868. For the advancement of this study of Drawing both in the higher and elementary schools, a conference of all the directors and teachers of the Schools of Art, was held in Brussels in 1869, the proceedings and conclusions of which will be found in the same chapter.

In the chapter on Prussia, you will find the regulations for instructions in Drawing, drawn up by the Minister of Public Instruction in 1831, and revised and re-issued in 1863, "after taking the advice of the professors in the Royal Academies in Berlin, Dusseldorf and Konigsberg, and of the provincial academic Councils, and several teachers of long experience," in reference to the requirements of Art and Industrial education, for the different classes in all the Secondary, Polytechnic and Trade Schools in the kingdom. To this programme I have appended a valuable paper on the best plan of giving instruction in Drawing in common schools, particularly in Prussia, prepared by Dr. Hentschel, an eminent teacher and writer on education,

You will find much to interest and instruct you, not only in the special objects of your inquiry, but in the whole subject of technical education, in the chapter on Wurtemburg, a kingdom in which elementary education is more nearly universal than in any other country of the same population in the world, and in which a most thorough and comprehensive system of Scientific and Industrial schools is in actual operation, in addition to an excellent system of general public schools, embracing all classes, from the Infant school to the University. In this chapter I have introduced a special report of the Minister of Education, on the details and results of the plan of instruction in Drawing, introduced into all the popular schools of the kingdom—the common, real and trade schools—for the avowed purpose of bringing the mechanical and manufacturing industries of the country up to the standard of France, Belgium,

Bavaria and other countries which had, of late years, done much for the artistic training of their workmen.

I would especially call attention to the manner in which the teachers of common schools of Wurtemburg are trained and encouraged, in order to give this instruction, both in their own, and in what are called the *Trade Improvement* schools, of which there were (in 1868) one hundred and twenty-two in different parts of the kingdom.

The progressive development of Art and Science in England, since the first parliamentary action on schools of design in 1837, down to the creation of the Department of Science and Art, in 1853, and the appropriation in 1869 for its service of £167,591; and the movement not yet consummated, in behalf of technical schools, will suggest many points of practical importance in your inquiry, in regard to the establishment of the same or a similar system of Drawing and Designing for manufactures in Massachusetts. This system, in 1869, included 107 Schools of Art with 20,050 pupils, and the grand total of persons taught Drawing through the agency of the department, was 120,928. In the account which I shall present of the present state of this movement in England, so as to include special technical instruction beyond the arts of design, I shall introduce the testimony of many manufacturers and capitalists, as well as the observations of engineers and committees as to both the necessity of this instruction and the best modes of introducing and extending it, which may prove serviceable in any enlargement of your present plans.

3. As to "the models, casts, etc., necessary to be supplied," you will find in this report several lists of such as have been found most useful in similar instruction in the different European schools, and the modes in which they have been multiplied and furnished to the schools. Copies of all can be very cheaply obtained by application to the proper governmental authorities having charge of this subject, in Wurtemburg, France and England; and from them a selection can be made, adapted to the wants of your own State and manufactured under your own auspices, so as to be supplied to your public schools at cost.

4. The details of "organization and supervision," should be committed to a special committee, acting under the general direction of the Board of Education, of which committee the secretary of the Board should be a member, and also one or more of the professors of this branch who should be charged with the duty of frequent personal inspection and of furnishing information and aid in organ-

izing classes, procuring teachers, and obtaining the necessary equipment.

5. "The best means of promoting," or at least an efficient means "of promoting among the people, an interest in the subject of Art education," will be to make an exhibition of the results of this teaching, in one good school in each of the different counties; as one good school in a county will be the best argument that can be addressed to the people of other towns in the same county, in behalf of the introduction of this new branch of instruction.

6. The success of the whole scheme will depend: *first*, on the selection of competent teachers; *second*, on the training of the students at the normal schools in the best methods of teaching Drawing; and for this purpose a special term should be given them for prosecuting the study, in addition to the daily practice during their connection with the school; *third*, the selection of the proper models, casts and patterns, which should be made by the State committee and furnished to the several schools without cost, or at least at a reduced price; *fourth*, an annual exhibition of the results of this teaching, at some central point in the county, for example, at the meetings of the Agricultural Societies, Teachers' Institutes, and County Associations; *fifth*, in frequent appeals, oral and printed, to the public on the relations of Drawing, and instruction in science to the industries of the State; and finally in some central museum of Industrial Art in Boston, which, I trust, will ere long equal the *Conservatoire* of Paris, the Technological or Industrial museums of St. Petersburg, Berlin and Stuttgart, and the South Kensington Museum of London.

Should you think the distribution of any of the articles or chapters in this Special Report, above referred to, will promote the object contemplated in your appointment, I shall be very glad to have them struck off for your use.

Very respectfully,
Your obedient serv't,

HENRY BARNARD,
Commissioner of Education.